

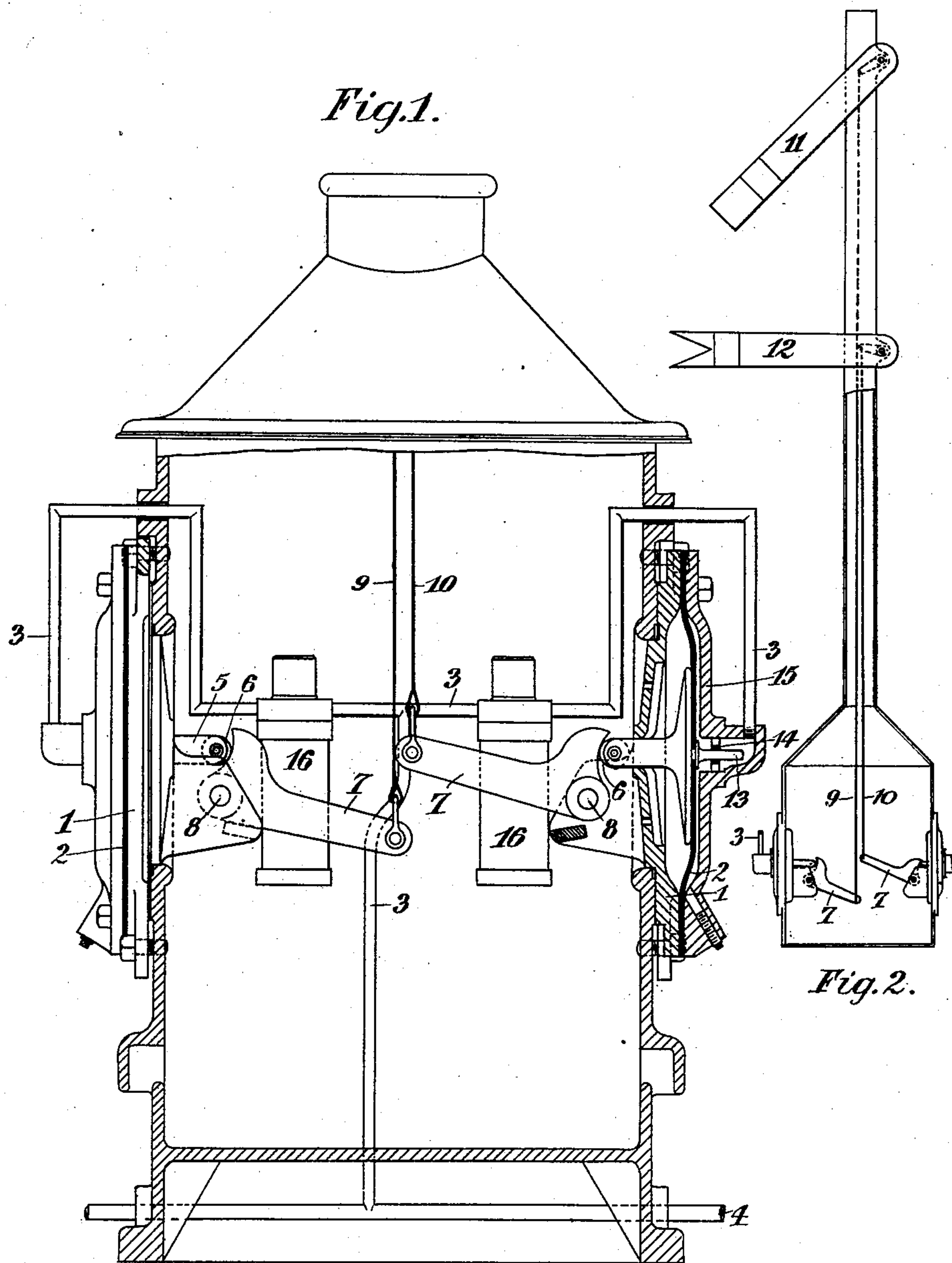
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PATENTED DEC. 22, 1903.

E. C. IRVING.
PNEUMATIC RAILWAY SIGNALING APPARATUS.

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NO MODEL.



Witnesses,

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UNITED STATES PATENT OFFICE.

ERNEST COPELAND IRVING, OF WESTMINSTER, ENGLAND, ASSIGNOR OF ONE-HALF TO JOHN PATRICK O'DONNELL, OF WESTMINSTER, MIDDLESEX COUNTY, ENGLAND.

PNEUMATIC RAILWAY SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 747,432, dated December 22, 1903.

Application filed April 3, 1903. Serial No. 150,959. (No model.)

To all whom it may concern:

Be it known that I, ERNEST COPELAND IRVING, a subject of the King of Great Britain and Ireland, residing at Palace Chambers, Bridge street, Westminster, in the county of Middlesex, England, (whose post-office address is Palace Chambers, Bridge street, Westminster, in the county of Middlesex, England,) have invented certain new and useful Improvements in and Relating to Pneumatic Railway Signaling Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-
 15 pertains to make and use the same.

This invention relates to improvements in pneumatic and like railway signaling apparatus; and it consists in apparatus of simple and compact construction and which at the
 20 same time is efficient in action.

The invention is herein described as applied for the operation of a semaphore-signal, but may of course be applied to the operation of other forms of railway-signals, such as disk
 25 signals and the like.

The principal difference between the present invention and those hitherto in use consists in the use of a diaphragm in lieu of the cylinder and piston hitherto employed for op-
 30 erating the signal.

I carry out my invention as follows, reference being made to the accompanying drawings, in which—

Figure 1 is a part section of the base of a
 35 signal-post, showing the arrangement for operating two signal-arms on the one post—for instance, home and distant signals, as illustrated in Fig. 2. Fig. 2 is an elevation of a signal-post, showing wire connections from
 40 the diaphragm to the home and distant signal arms on the signal-post.

To the base of the signal-post is bolted or screwed a diaphragm casing or casings 1, (the number corresponding with the number of sig-
 45 nal-arms on the post,) in which is the flexible diaphragm 2, adapted to be actuated by air or other fluid pressure admitted thereto through pipe connection 3 from the main supply-pipe 4. A rod 5, connected to the diaphragm, is
 50 provided with a roller 6, which bears against the free end of a lever or crank 7, fulcrumed

at 8 on the diaphragm-casing 1 or on the signal-post, the other end of said lever (or levers, as the case may be) being connected to or arranged to act on the end of the connection
 55 to the semaphore-arm, as shown in the drawings. The ends of the levers 7 are connected to wires 9 and 10, which actuate, respectively, signal-arms 11 and 12, Fig. 2. The rod 5, connected to the diaphragm, is guided on both
 60 sides of the diaphragm by working in the diaphragm-casing 1 on the one side and by having a projection 13 on the other side which works in a web or bush 14 on the cover 15 of the diaphragm-casing.

16 represents an electromagnetic valve device, through which fluid-pressure may be admitted to and exhausted from the diaphragm 2 when the electric circuit is made or broken, or vice versa. The electromagnetic valve de-
 70 vice 16 may be of any known or suitable construction. For example, it may be the same as that described and illustrated in the prior specifications of British Letters Patent No. 6,553 of 1901 and No. 5,511 of 1902.

Referring to the right-hand diaphragm, (shown in Fig. 1,) the air-pressure has been relieved from said diaphragm, thereby caus-
 80 ing the signal-arm 12, Fig. 2, to assume the danger position. The left-hand diaphragm is being acted upon by the air-pressure, which forces the rod 5 and roller 6 against one end or arm of the lever or bell-crank 7, thereby pulling wire 9 and causing the signal 11, Fig. 2, to assume the safety position. When the
 85 diaphragm is relieved from air-pressure, as above described with reference to the right-hand diaphragm, the signal-arm 12, Fig. 2, moves to "danger" by gravity, the spectacle or right-hand end of the arm being suitably
 90 weighted for that purpose.

The apparatus shown in the drawings is intended chiefly for the automatic working of signals by a train or vehicle entering and leaving an insulated track-section through a
 95 track-section, the electromagnet of valve device 16 being energized (or deenergized, as the case may be) through an electric relay by a train or a pair of wheels and their axle entering the section, which operates the valve,
 100 so as to exhaust the air-pressure from diaphragm 2, thus causing the signal-arm to as

sume the danger position, and again when the train or vehicle leaves the section the magnet of valve device 16 is deenergized, (or energized, as the case may be,) so as to again admit compressed air from the main 4 through pipe 3 to the diaphragm 2, which through lever 7 and wire 10 (or 9, as the case may be) lowers the signal-arm to "safety." Such an automatic system is more fully described in the prior specification of Letters Patent No. 6,553 of 1901. It is obvious, however, that the diaphragm apparatus substantially as described above may be employed for operating signals or other parts in such a system of signaling as that described and illustrated in the prior specification of United States Letters Patent No. 647,483, wherein the signalman by means of an interlocking lever or bar controls the admission of compressed air to and its exhaust from a piston in a cylinder for operating the signals, the diaphragm movement being substituted for said piston and cylinder. The compressed air may, if desired, be alternately admitted to and exhausted from either side of the diaphragm, so that the signal may be moved to either of its positions by compressed air, as with the piston-and-cylinder arrangement above referred to. In lieu of wires 9 and 10 rods might be employed, and lever 7 may be so arranged in connection with the diaphragm 2 that a push or upward movement is given to the rod for operating the signal to one of its positions (for example, the "safety" position) and a pull or opposite movement for moving the signal to the other position.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In railway signaling apparatus, a diaphragm as the means for operating the signal, said diaphragm itself being operated by compressed air direct from a central station or indirectly from said station through a track-circuit, substantially as set forth.

2. In a fluid-pressure railway signaling apparatus a flexible diaphragm adapted to be actuated by the motive fluid; a lever pivoted on the diaphragm-casing; a connection between said diaphragm and one arm of said lever whereby said lever is rocked when said diaphragm is moved; a connection between said lever and a signal-arm or other movable part whereby said signal-arm or part is operated when said lever is moved; and means for admitting the motive fluid to said diaphragm, substantially as described.

3. In pneumatic railway-signaling, a flexible diaphragm, a casing inclosing said diaphragm and adapted to be attached to a signal-post, a plate and (or) rod in operative connection with the diaphragm, guides for said rod in the casing, a friction-roller on one end of said rod, a lever pivoted on the diaphragm-casing one end of said lever being adapted to be operated on by the friction-roller, a wire connecting the other end of said lever to the signal-arm, and means for admitting the motive fluid to and exhausting it from the diaphragm, all substantially as described with reference to the drawings annexed.

In testimony whereof I affix my signature in presence of two witnesses.

ERNEST COPELAND IRVING.

Witnesses:

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